

# PATENT COOPERATION TREATY

# PCT

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## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Rec'd PCT/PTO 02 JUL 2004

Applicant's or agent's file reference <b>XA1622</b>	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. <b>PCT/GB02/05732</b>	International filing date (day/month/year) <b>17.12.2002</b>	Priority date (day/month/year) <b>02.01.2002</b>
International Patent Classification (IPC) or both national classification and IPC <b>H01F7/18</b>		
Applicant <b>BAE SYSTEMS PLC et al.</b>		

1. This International preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 4 sheets, including this cover sheet.
 

☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of    sheets.

3. This report contains indications relating to the following items:
 

I    ☒ Basis of the opinion

II   ☐ Priority

III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability



IV ☐ Lack of unity of invention

V   ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

VI ☐ Certain documents cited

VII ☐ Certain defects in the international application

VIII ☐ Certain observations on the international application

Date of submission of the demand  <b>07.06.2003</b>	Date of completion of this report  <b>19.09.2003</b>
Name and mailing address of the international preliminary examining authority:   <b>European Patent Office</b> <b>D-80298 Munich</b> <b>Tel. +49 89 2399 - 0 Tx: 523656 epmu d</b> <b>Fax: +49 89 2399 - 4465</b>	Authorized Officer  <b>Gianni, G</b>  Telephone No. +49 89 2399-2660  

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. **PCT/GB02/05732**

**I. Basis of the report**

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

**Description, Pages**

1-28 as originally filed

**Claims, Numbers**

1-33 as originally filed

**Drawings, Sheets**

1/6-6/6 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

**INTERNATIONAL PRELIMINARY  
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5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Yes: Claims	1-32
	No: Claims	33
Inventive step (IS)	Yes: Claims	1-32
	No: Claims	33
Industrial applicability (IA)	Yes: Claims	1-32
	No: Claims	33

2. Citations and explanations

**see separate sheet**

**Concerning item V**

**Field:** The invention relates to a bridge circuit and a method of operating said bridge to generate an output signal that produces a desired force from an electromagnet connected across the output of the bridge circuit.

**Prior art:** In a known current controller the electromagnet is connected across the output of the half-bridge circuit. Control of the current is achieved by analogue switching of a pair of transistors positioned on opposed arms of the circuit. The switching signals are modulated according to a pulse width modulation scheme according to an analogue-implemented scheme.

**Drawbacks:** The noise performance of this known controller is limited and its performance suffers accordingly.

**Solution:** A method as disclosed in claim 1 and processing means programed to perform the method steps.

**Assessment:** By implementing the method steps current and force demands can be accommodated by converting those demands into a corresponding voltage demand that is used to set a corresponding voltage across the electromagnet thereby to generate the required current through the electromagnet or the required force provided by the electromagnet.

Using bipolar switching, i.e. switching between three voltage levels  $+V_s$ ,  $0V$  and  $-V_s$ , gives advantages over the prior art controller that uses unipolar switching i.e. switching between  $V_s$  and  $-V_s$  only since additional resolution performances are obtained.

The documents cited in the search report either individually or in combination with each other would not suggest the possibility of implementing the overall idea by the means set out in claim 1.